Recent Changes in Aerospace Standards: What You Need to Know

An ABS Quality Evaluations
White Paper

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# Recent Changes in Aerospace Standards:
## What You Need to Know

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Background
As anyone involved in the aerospace industry well knows, building an aerospace vehicle and related products is an arduously complex task involving the interaction of literally millions of moving parts and requiring close cooperation between designers, engineers, suppliers, and manufacturers.

Prior to the adoption of an aerospace-specific quality standard, aerospace manufacturers and suppliers often relied on ISO 9000 and their own proprietary standards, which in many cases created a patchwork of often contradictory and mutually unintelligible requirements.

In an effort to create order out of confusion and establish a uniform standard specifically suited to the special requirements of the aerospace industry, key players came together collaboratively under the auspices of the International Aerospace Quality Group (IAQG) to produce aerospace standard AS9000, subsequently updated as AS9100.

Since the initial introduction of AS9100, a host of additional standards have been crafted and subsequently modified in a continuing effort to promote customer satisfaction and product quality by means of effective and comprehensive Aerospace Quality Management Systems (AQMS).

Introduction
AQMS requirements are continually changing. As aerospace suppliers, OEMs, regulators, and certification bodies (CBs) use various standards and systems, the need for improvement becomes more apparent. Even though these changes are beneficial to the industry as a whole, they can create problems when extensive adjustments are required for an organization’s AQMS to stay in compliance.

This white paper provides an in-depth look at recent and upcoming changes to the AQMS requirements so that you and your organization will not be caught off guard when they come into place.

Specifically, the present document addresses key changes in the following standards and related procedures:
- AS9100C:2009 – “QMS for Aviation, Space & Defense Organizations”
- Key Rules for Transition Audits
- AS9101D: “Audit Requirements for Aviation, Space & Defense Organizations”
- AS9104/1: “Requirements for Aviation, Space, and Defense Quality Management System Certification Programs”
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Key Changes to AS9100C:2009

The latest iteration of the QMS standard for aviation, space and defense organizations, AS9100C:2009, has recently undergone several changes, the most significant of which are discussed in this section.

Definition of “Risk”
Clause 3.1 of the standard introduces and defines the term “risk” as “an undesirable situation or circumstance that has both a likelihood of occurring and a potentially negative consequence.” The rationale is that a proper understanding of risk is important for an organization to develop a proactive quality management system.

Definition of “Special Requirements”
Clause 3.2 of the standard introduces and defines the term “special requirements” as “requirements identified by the customer or organization that have a high risk of achievement and are of significant importance to product performance, safety, delivery, or customer satisfaction.”

The primary rationale is that an organization must understand the importance of “special requirements” and how they impact related concepts such as “critical items” and “key characteristics.” A secondary rationale is to ensure that the organization systematically addresses special requirements and links them to risk management activities.

Definition of “Critical Items”
Clause 3.3 of the standard introduces and defines the term “critical items” as “those items having significant effect on product realization.”

The primary rationale is that an organization must understand the importance of “critical items” and their relationship to the special requirements identified in the previous section. A secondary rationale is to ensure that the organization systematically addresses critical items and links them to risk management activities.
AQMS General Requirements
Clause 4.1 of the standard was relocated and revised to address customer and applicable statutory and regulatory requirements. The rationale is that it is important for the organization to place this requirement at the level of the AQMS as a whole, not just at the documentation level.

Removal of Requirement to Illustrate Relationship between AS9100 and Documented Processes
Clause 4.2.2 of the standard was revised by deleting the former requirement to provide a document illustrating the relationship between the AS9100 standard and the organization’s documented processes and procedures under the rationale that said requirement was too prescriptive and added no value to ensuring product quality to stakeholders.

Customer Focus / Customer Satisfaction
Clause 5.2 of the standard was revised by adding a statement that the organization’s management is responsible for ensuring product conformity and on-time delivery as well as taking remedial action when necessary.

Clause 8.2.1 of the standard introduces the requirement that organizations evaluate customer satisfaction and also emphasizes that organizations seeking initial registration to AS9100C:2009 must demonstrate to certification bodies that on-time delivery and customer satisfaction have been measured for a minimum of 12 months prior to their audit.

The rationale is that it is necessary to continually improve customer satisfaction as well as establish a clear relationship between the AQMS and the organization’s performance in accordance with IAQC strategy.
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Product Realization Management
Clause 7.1.1 of the standard was revised by adding a requirement that the organization’s management is responsible for planning and managing product realization in a structured and controlled manner to meet requirements at acceptable risk levels and within resource and schedule constraints.

The rationale is that most aviation, space and defense (ASD) products are complex and involve multi-tiered partnerships and distribution networks that must be managed in a manner that promotes product realization. Specifically, the new requirement provides additional focus on the importance of proactive planning and project management throughout the product realization process.

Risk Management
Clause 7.1.2 of the standard was revised by adding a new requirement to implement a risk management process applicable to the product and organization to cover risk-related responsibilities, acceptance criteria and mitigation measures.

The rationale is that it is necessary for the organization to place additional focus on product risk during the product realization process.

Those seeking guidance material on risk management principles and procedures are referred to Chapter 11.2 of the IAQC Supply Chain Management Handbook (SCMH).

Configuration Management
Clause 4.3, which focuses on product configuration management and how it is sustained throughout product realization activities, was moved to clause 7.1.3 to align the requirements with ISO 10007. Specifically, clause 7.1.3 defines and sets forth requirements relative to configuration management planning, configuration identification, change control, and configuration status accounting and auditing.

In addition, clause 7.1.3 stresses that configuration management is a requirement even for those organizations that omit design-related clause 7.3. Those seeking guidance material on the subject are referred to Chapter 11.3 of the IAQC SCMH.
**Work Transfers**
Clause 7.1.4 of the standard was relocated and revised to include the requirement that the organization must have procedures in place to cover internal and external work transfer activities. The clause was also expanded to include permanent work transfers to other locations and/or organizations.

The rationale is that because the organization can decide on transferring work at anytime during its product realization process, work transfer procedures should address common situations and associated problems that often occur.

Clause 7.1.4 also stresses the need for the organization to remain focused on on-time delivery and customer satisfaction expectations when making work transfer decisions. Those seeking guidance material on the subject are referred to Chapter 11.1 of the IAQC SCMH.

**Purchasing**
A note was added to clause 7.4.1 of the standard to point out that the organization may use objective and reliable data from external sources (for example, the IAQC OASIS database) when selecting and evaluation suppliers.

The rationale is that clause 7.4.1 must be adapted to recognize the growing industry trend to use externally provided supplier performance data.

Examples of approval status (approved, conditional or disapproved), as well as examples of approval scope (by product or process type), are also provided under the rationale that the organization’s criteria for using a particular supplier depends on the latter’s status.

**Validation of Test Reports**
Clause 7.4.3 of the standard was revised by eliminating the requirement to validate test reports for raw materials and purchased products under the rationale that this is a misunderstood concept that is often misapplied and does not apply to all organizations and types of products.

**Product Process Verification**
Clause 7.5.1.1 of the standard was relocated from clause 8 in acknowledgement that the common product verification technique known as “first article inspection” is a process used to ensure “product realization capability” under controlled conditions. The clause was also revised to allow justifiable exclusions as indicated in clause 1.2 of the standard.

**Internal Audits**
Clause 8.2.2 of the standard was revised by eliminating the requirement to use specific tools and techniques when performing audits of the AQMS against the standard.
The rationale is that the requirement to use specific auditing tools and techniques is too prescriptive and should more properly be classified as guidance material. In addition, it was determined that stipulating such a requirement would hinder the utilization of process-based internal auditing approaches.

**Monitoring and Measurement of Product Sampling Inspection**
Clause 8.2.4 of the standard was revised by requiring that organizations that employ sampling inspections for product acceptance must use sampling programs that are appropriate for use and based upon recognized statistical principles.

The rationale is that further clarification and guidance are required on the proper application of this technique, particularly as prior requirements were statistically inaccurate and too prescriptive.

**Key Rules for Transition Audits**
For organizations contemplating audits to transition to the current aerospace standards, the most salient points are as follows.

**Transition Audit Deadline**
Organizations certified to AS9100B and/or AS9120 (AS9120 is the AQMS standard for distributors) shall have a “transition” audit no later than January 1, 2013, as certificates against those standards shall be withdrawn from the IAQC OASIS database on that date by certification bodies such as ABS Quality Evaluations (ABS QE).

Rules for transitioning an organization’s certification to the latest standards are defined in AS9104A, Supplemental Rule 001, available on the IAQG OASIS home page (https://www.sae.org/?PORTAL_CODE=IAQG).

Other related requirements include:
- Any AQMS audit with a start date after July 1, 2011, shall be performed to the new revisions of the AQMS standards.
- The certificate will keep the same expiration date as the previous certificate issued unless the transition audit occurs during a renewal audit.
- Clients can option to have an earlier renewal audit during the transition audit in order to get a new three-year certificate.

**Important Note:** IAQG has ruled that if an organization fails to have a transition audit at its next scheduled audit by July 1, 2012, the certification body must suspend the client’s certificate until the transition audit is completed. Failure to complete the transition audit will result in the certificate being withdrawn by ABS QE.
Special circumstances for failing to complete the transition audit must be presented to the ANAB accreditation body for review.

**Certification Bodies, Transition Auditors, and Transition Audit Readiness**

IAQG has defined rules for certification bodies when determining audit durations for transition audits. Rules are defined in clause 7 of AS9104A, Supplemental Rule 001.

- Aerospace auditors are required to attend and successfully pass IAQG Aerospace Auditor Transition Training (AATT) prior to completing any AS9100C:2009 and/or AS9120:2009 audits. ABS QE auditors have attended and successfully passed the AATT exams. Each auditor’s approvals are listed within the OASIS database, Auditors AEA/non-AEA tab.
- Previous audit nonconformities must be completely closed by the certification body (e.g., ABS QE) prior to “transition” audits.

Note: Clients currently certified to the previous revisions of the AQMS standards shall declare their readiness to ABS QE prior to the start of their “transition” audit. In this regard, ABS QE has already sent its clients an informational letter and declaration-of-readiness form.

**Transition Audit Schedule**

Transition audits shall be performed in accordance with the transition requirements in AS9104A SR001, dated January 25, 2012.

**Key Changes to AS9120A:2009**

Aerospace standard AS9120A:2009, “QMS for Aviation, Space and Defense Organization Distributors,” has also undergone significant changes and revisions.

**Overview of Changes**

The IAQG deemed that it would be in the best interests of the aerospace industry to modify AS9120A:2009 by:

- Incorporating the requirements of ISO 9001:2008
- Expanding the scope of the standard to include aviation, space and defense (ASD) sectors and requirements
- Removing references to the term “stockist”
- Providing additional focus on IAQG’s objective of on-time and on-quality deliveries
- Ensuring the standard is compatible for use by all stakeholders and organizations of all types and sizes
- Ensuring the standard remains recognized by authorities
Counterfeit Parts / Suspected Unapproved Parts (SUP)
Clauses 3.3 and 3.7 of the standard were modified by defining the difference between “counterfeit” parts and “suspected unapproved parts (SUP).”
- Counterfeit parts are those deemed to be fraudulent imitations of existing products and lacking authority for use.
- Suspected unapproved parts (SUP) are those deemed as potentially acceptable but lacking authority for use.

Definition of “Risk”
Like AS9100C:2009, clause 3.5 of AS9120A:2009 introduces and defines “risk” as “an undesirable situation or circumstance that has both a likelihood of occurring and a potentially negative consequence.”

The rationale is that a proper understanding of risk is important for a distributor to develop a proactive quality management system.

Removal of Requirement to Illustrate Relationship between AS9120A:2009 and Documented Processes
Like AS9100C:2009, clause 4.2.2 of AS9120A:2009 was revised by deleting the former requirement that the distributor provide a document illustrating the relationship between the standard and the distributor’s documented processes and procedures under the rationale that said requirement is too prescriptive and adds no value to ensuring product quality to stakeholders.

Record Retention Requirement
Clause 4.2.4 of the standard was revised by eliminating the requirement that the distributor retain records for a minimum of seven years under the rationale that such a requirement is too prescriptive and potentially conflicts with customer and statutory requirements.

Customer Focus / Customer Satisfaction
Like AS9100C:2009, clause 5.2 of AS9120A:2009 was revised by adding a statement that the distributor’s management is responsible for ensuring product conformity and on-time delivery as well as taking remedial action when necessary.
Like AS9100C:2009, clause 8.2.1 of the standard introduces the requirement that distributors develop and implement plans for improving customer satisfaction to address deficiencies in this area and evaluate the effectiveness of remedial actions taken.

The rationale for these additions is that it is necessary to continually improve customer satisfaction as well as establish a clear relationship between the AQMS and the distributor’s performance in accordance with IAQC strategy.

**Product Realization Planning**
Clause 7.1 was added because a product realization planning clause was previously excluded from the 2002 version of the standard. The rationale is that distributors do provide a product—in this case, a service—that must be planned. Examples cited include such activities as kitting, purchasing and repackaging.

**Configuration Management / Identification and Traceability**
Clause 7.1.1, “Configuration Management,” and clause 7.5.3, “Identification and Traceability,” were added to the standard in accordance with ISO 10007 because they were deemed applicable to distributors.

**Work Transfers**
Clause 7.1.2 of the standard was added to include the requirement that the distributor must have procedures in place to cover internal and external work transfer activities. The clause was also expanded to include permanent transfers of work to other locations and/or organizations.

The rationale is that because the distributor can decide on transferring work at anytime during its product realization process, work transfer procedures should address common situations and associated problems that often occur.

Those seeking guidance material on the subject are referred to Chapter 11.1 of the IAQC SCMH.
Purchasing
A note was added to clause 7.4.1 of the standard to point out that the distributor may use objective and reliable data from external sources when selecting and evaluation suppliers under the rationale that the clause should recognize the growing industry trend to use externally provided supplier performance data.

Like AS9100C:2009, the clause also provides examples of approval status (approved, conditional or disapproved), as well as examples of approval scope (by product or process type), under the rationale that the distributor’s criteria for using a particular supplier depends on the latter’s status. In fact, the distributor must define the process for suppliers’ approval status decisions or changes.

Monitoring and Measurement of Product Sampling Inspection
Like AS9100C:2009, clause 8.2.4 of AS9120A:2009 was revised by requiring that organizations that employ sampling inspections for product acceptance must use sampling programs that are appropriate for use and based upon recognized statistical principles.

The rationale is that prior requirements were statistically inaccurate and too prescriptive.

Key Changes to AS9101D
Aerospace standard AS9120D, “Audit Requirements for Aviation, Space and Defense Organizations,” has undergone numerous changes with regard to new audit process and reporting requirements.

Overview of Audit Process Changes
The standard’s audit process was completely revamped by:

- Including aviation, space and defense (ASD) industry expectations and requirements.
- Incorporating the two-stage audit approach (stage 1/stage 2) required under ISO17021. Two individual audit reports are now required for each audit activity: Appendix F (stage 1 audit report) and Appendix E (stage 2 audit report).
- Eliminating audit scoring by no longer requiring or entering audit scores in the OASIS database.
- Eliminating use of the previous AS91XX series audit checklists.
- Placing a greater emphasis on audit preplanning. The standard now requires that lead auditors perform a thorough review during the preplanning stage of the client organization’s performance data and metrics (12 months’ minimum of data), including key performance indicators (KPIs) and on-time delivery and customer satisfaction data. In fact, the organization must have at least 12 months of performance data before the initial audit can even begin.
- Providing various audit methodologies and activities to assist auditors and improve the audit process.
- Requiring that audits be performed using a compliance and process-based auditing approach.
The standard’s audit reporting requirements were completely revamped by:

- Requiring that Process Effectiveness Assessment Record (PEAR) reports (Appendix C) be documented by the audit team when auditing processes related to AS9100C:2009, clause 7, “Product Realization.”
- Requiring that client organizations demonstrate how they measure their AQMS for “process effectiveness,” typically by assigning key performance indicators to the organization’s processes. Auditors will evaluate said processes and KPIs to quantify the level of process effectiveness and will document the results on PEAR reports.
- Requiring that client organizations respond to corrective action reports issued by certification body (e.g., ABS-QE) lead auditors within 30 days of issuance of a Nonconformance Report (Appendix B), detailing immediate containment actions for significant / critical issues.
- Requiring the mandatory use of audit reports: Appendices A through G.
- Providing special audit requirements with regard to customer complaints and OASIS feedback, as well as additional requirements for client organizations that transfer to a new certification body.
- Instituting a single Objective Evidence Record (OER) (Appendix A) to audit all three AS91XX series standards concurrently, thereby replacing separate AS9101, AS9111 and AS9121 checklists.
- Requiring lead auditors to determine the client organization’s top 5 aviation, space and defense (ASD) customers during the preplanning stage to focus audit activities on said customers, particularly with regard to contract flowdown requirements. Auditors must also select audit samples from the client organization’s top 5 ASD customers.

**Mandatory Audit Reporting Appendices**

- Appendix A – Objective Evidence Record (OER)
- Appendix B – Nonconformance Report (NCR)
- Appendix C – Process Effectiveness Assessment Record (PEAR)
- Appendix D – QMS Process Matrix Report
- Appendix E – Stage 2 Audit Report (Renewal, Surveillance, Special)
- Appendix F – Stage 1 Audit Report
- Appendix G – Supplemental Audit Report (multisite — documents specific site info.)

Note: Copies of the appendix reports are included in the AS9101D standard.
Key Changes to AS9104/1
Aerospace standard AS9104/1, “Requirements for Aviation, Space, and Defense Quality Management System Certification Programs,” is a total rewrite of AS9104 and includes significant changes that affect certification bodies.

Audit Table and Minimum Audit Durations
The standard introduces a new audit day table (Table 2) for certification bodies when calculating audit durations. The table defines on-site audit durations and requires certification bodies to add additional time for breaks, meals, and planning and report writing.

The OASIS database has been revised to verify minimum audit durations were completed by the audit team. If minimum audit durations are not completed, the database will prevent the certification body from uploading the audit reports, which, in turn, will prevent issuance of the certificate to the client organization.

Note: All ABS QE proposals/quotes are reviewed by the Global Aerospace Program Manager to ensure full compliance with all IAQG requirements.

New Certification Structure Definitions
Clause 3.11 of the standard introduces several new definitions relative to the structure of the site or sites to be audited and certified, namely single site, multiple site, campus, several sites and complex sites.

The rationale is that the length and scope of an audit are dependent on the structure of the site that is to be certified.

Note: ABS QE and the client organization must agree on the certification structure prior to beginning the audit.

OASIS Administrator Requirements
Clause 6.7 lists important requirements relating to the client organization’s need to maintain an administrator to handle OASIS database activities:

• The certification body shall ensure that each client organization has assigned an administrator to manage access to the organization’s audit data and results, user data and feedback information in the OASIS database.

• The administrator shall be identified and registered in the OASIS database prior to the initial certification audit. During surveillance and recertification audits, the certification body shall also verify that the certified organization’s current OASIS database administrator is registered in the OASIS database.

Note: The certification body may suspend a client organization’s certificate or delay issuance of recertification if the organization fails to maintain an OASIS database administrator as required.
Client Requests to Change/Substitute Auditor
Clause 6.12 of the standard no longer allows client organizations to request that auditors be changed or substituted without “substantiated evidence” of improper activity or contract violations. Conformance to rules concerning export controls, auditor nationalities and confidentiality/conflict of interest challenges are exceptions to this requirement. Certification bodies shall also be able to assign and rotate auditors as needed.

Audit Durations
Clause 8.2.1 of the standard defines methods for calculating audit durations in accordance with Table 2 and also defines new rules for determining audit durations for client organizations that request certification to more than one aerospace standard (for example, an organization certified to AS9100C:2009 requests additional certification to AS9120A:2009).

Nonconformity Management
Clause 8.4 of the standard requires that the certification body initiate the certification suspension process when the client organization fails to demonstrate that conformance to the applicable standard has been reestablished within 60 days from the issuance of a Nonconformity Report (NCR).

Note: Nonconformity management requirements are contained in aerospace standard AS9101D.

Certificate Transfers
Clause 8.8 of the standard states that:
- Certificates may not be transferred between certification bodies if the existing body has documented nonconformities awaiting corrective action closure unless the body has ceased operations.
- Transfer of existing certificates expiring within 12 months shall require a Stage 1 and Stage 2 audit by the new certification body. In addition, an AEA-qualified auditor must conduct a special on-site audit to validate the current certificate and previous audit results.
- A new certificate shall not be issued unless the certification body is able to verify that the client organization satisfactorily contained and corrected all minor and major nonconformities, performed root cause analysis, implemented corrective actions, and verified the effectiveness of the preceding.

Auditor Rotation
Clause 8.3.8 of the standard introduces auditor rotation requirements (for example, lead auditors must be rotated every two certification cycles or six years) to prevent auditor familiarity, which can lead to “soft” auditing.
**Closing Remarks**

Aerospace standard AS9104/1 was voted upon at the IAQG meeting that took place in Bordeaux, France, and the ballot passed in all three sectors: AAQG – Americas Aerospace Quality Group, EAQG – European Aerospace Quality Group and APAQG – Asia Pacific Aerospace Quality Group.

IAQG has set a 18 month maximum period for certification bodies to complete transition activities and achieve reaccreditation from their accreditation body.

**Certified Aerospace Solutions**

Confused about the myriad changes to the various aerospace standards?

Worried that you will not be able to transition to the latest standard by the January 1, 2013 deadline? Concerned that your vendors and distributors do not meet the high standards expected in the aerospace industry?

Don’t be.

ABS Quality Evaluations (ABS QE) serves aerospace customers worldwide with expert management system certifications and exceptional customer service.

We are sensitive to the local needs of each market we serve, while our global resources provide aerospace industry expertise and an unmatched knowledge of aerospace certification processes.

Our aerospace clients give us extremely high marks for the quality of our audit processes, for our reports, and for the value they receive from working with us.

ABS Quality Evaluations offers certifications to the full suite of aerospace standards to help you maintain effective quality management systems.

As an independent third-party specialist, we can assess and certify your management system to the relevant standard.

We also provide a variety of support, including certification, inspection, expertise, audit services, vendors’ assessments, training and documentation covering all of the aerospace standards that impact your business.

Regardless of your needs, you have a trusted partner in the aerospace industry: ABS QE.